



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/905,761	07/13/2001	Gaylon S. Campbell	8050	3577

7590 09/22/2003

L. GRANT FOSTER
HOLLAND & HART LLP
555-17TH STREET, SUITE 3200
P.O. BOX 8749
DENVER, CO 80201

EXAMINER

JACKSON, ANDRE K

ART UNIT PAPER NUMBER

2856

DATE MAILED: 09/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/905,761

Applicant(s)

CAMPBELL ET AL.

Examiner

André K. Jackson

Art Unit

2856

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-7 and 9-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7 is/are allowed.
- 6) ☒ Claim(s) 2-6 and 9-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 6,9-12,14 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Woodhead et al.

Regarding claim 6, Woodhead et al. discloses an oscillator to provide a square wave voltage signal and a transmission line having an input and an output and a phase detector detecting a phase difference between the square wave voltage provided by the oscillator and the transmission line and the phase detector providing an output signal indicative of the phase difference caused by changes in moisture content of a medium surrounding the transmission line (Columns 2-5).

Regarding claim 9, Woodhead et al. disclose providing a transmission line having an input and an output, embedding the transmission line into a bulk material, providing a signal to the in put of the transmission line providing a phase detector and the phase detector

measuring a phase difference between the reference signal and the output signal from the transmission line to determine a moisture content of the bulk material surrounding the transmission line (Abstract, columns 2-5).

Regarding claim 10, Woodhead et al. disclose determining the dielectric constant of the bulk material by the phase difference to measure the moisture content of the bulk material (Abstract).

Regarding claim 11, Woodhead et al. disclose where a time domain reflectometry waveform is used to measure the phase difference (Column 2).

Regarding claim 12, Woodhead et al. disclose where a frequency domain waveform is used to measure the phase difference (Columns 2-4).

Regarding claim 14, Woodhead et al. disclose where insulating the transmission line from the bulk material being measured (Column 3).

Regarding claim 15, Woodhead et al. disclose using a circuit to route signals secure circuit components and secure the transmission line (Columns 2-4).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made

to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodhead et al. in view of Campbell et al.

Regarding claim 2, Woodhead et al. discloses a "Dielectric constant monitor" which discloses first and second elongate members (Column 2) an oscillator to provide a square wave signal and a transmission line being coupled to receive the square wave voltage signal from the oscillator through a resistor and a phase detector to detect the difference in phase between the square wave voltage signal and the signal provided to the transmission line, the phase detector being further constructed to provide an output signal indicative of the difference in phase between a square wave signal provided to the transmission line through the resistor and response of the transmission line (Columns 2-5). What is not explicitly disclosed by Woodhead et al is where the sensor electronics is mounted on the first member. However, Campbell et al. disclose an "Evaluation of simple transmission line oscillators for soil moisture measurement" which has where the sensor electronics is mounted on the first member (Page 37). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Woodhead et al. to include where the sensor electronics is mounted on the first member as taught by Campbell et al. since this would make the invention more compact. Woodhead et al. do not explicitly disclose direct current; however, it is considered a design

choice and well within the purview of the skilled artisan to include a direct current source.

Regarding claim 3, Woodhead et al. disclose where the sensor electronics is proportional to the water content of bulk material (Abstract, column 2).

Regarding claim 4, Woodhead et al. discloses a semiconductor circuit having first and second inputs and an output where the output of the circuit being indicative of a phase difference of the signals applied to the first and second inputs of the semiconductor circuit and being coupled to an oscillator to receive the square wave voltage signal and the second circuit coupled to the transmission line and a resistor and a capacitor (Columns 2-5).

Regarding claim 5, Woodhead et al. disclose where the dielectric constant of a bulk medium is using a transmission line embedded in the bulk material and the transmission line comprising traces on an elongated circuit board having a semiconductor circuit (Columns 3 and 4).

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Woodhead et al. in view of Campbell et al.

Regarding claim 13, Woodhead et al. does not explicitly disclose where the transmission line is secured within a circuit board. However, Campbell et al. disclose where the transmission line is secured within a circuit board (Page 37). Therefore, it would have been obvious to one of

ordinary skill of the art at the time of invention to modify Woodhead et al. to include the transmission line is secured within a circuit board as taught by Campbell et al. since they are from the same field of endeavor.

6. Claim 7 is allowed.

Regarding claim 7, Prior art found and relied upon did not disclose a semiconductor circuit having first and second inputs and an output and the output being indicative of a logical exclusive OR function of signals applied to the first and second inputs of the semiconductor circuit together with the remaining limitations of the claim. In the Examiner's opinion it would have not been obvious to the skilled artisan to include a semiconductor circuit having first and second inputs and an output and the output being indicative of a logical exclusive OR function of signals applied to the first and second inputs of the semiconductor circuit.

Response to Arguments

7. Applicant's arguments filed 06/30/03 have been fully considered but they are not persuasive.

Frequency (f) = number of oscillations per second in a wave train.

Wavelength (λ) = is the distance between any two points on a wave train (wave form) i.e. crest to next crest, trough to next trough or from the start of the wave cycle to the next start of the wave cycle.

When the frequency is high the wavelength becomes shorter and when the frequency is low the wavelength becomes longer. The phase shift is basically the delay of the frequency wave from one point to another. Applicants argue that Woodhead et al. does not teach a "phase detector". Woodhead et al. does detect the phase shift using a microprocessor and measuring the material moisture content by the increase/decrease in line delay of the wave train (waveform) (Column 2, lines 34-42; Column 3, lines 30-49).

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Art Unit: 2856

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to André K. Jackson whose telephone number is (703) 305-1522. The examiner can normally be reached on Mon.-Thurs. 7AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (703) 305-4705. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

A.J. 
September 17, 2003


HEZRON WILLIAMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800